

### REMARKS/ARGUMENTS

Claims 16-24 are pending herein. Claims 5-15 have been cancelled hereby in favor of new claims 16-24. Applicant respectfully submits that no new matter has been added.

1. Examiner Bos is thanked for courtesies extended to Applicant's undersigned representative during a telephonic interview on August 11, 2003.
2. The §112, first paragraph rejection of claims 5, 7 and 12 is noted, but deemed moot in view of cancelled claims 5, 7 and 12 and in view of new claims 16 and 18 submitted above. Accordingly, Applicant respectfully requests that the above rejection be reconsidered and withdrawn.
3. The §112, second paragraph rejection of claims 5-15 is noted, but deemed moot in view of cancelled claims 5-15 and in view of new claims 16-24 submitted above. Accordingly, Applicant respectfully requests that the above rejection be reconsidered and withdrawn.
4. Claims 5-15 were rejected under §103(a) over Mayer '947, or Ogihara '410 or Manev '943. Applicant respectfully submits that this ground of rejection is moot in view of the cancellation of claims 5-15. To the extent that this rejection might again be applied against new claims 16-24, it is respectfully traversed.

Claim 16 recites a method for reducing the internal resistance of a lithium secondary battery that includes a positive active material containing a lithium manganese oxide having a cubic spinel structure. The method comprises the steps of: (a) mixing lithium-containing compounds with manganese-containing compounds to form a mixture, (b) firing the mixture in an oxidizing atmosphere at a temperature of 650°C to 1000°C for 5 to 50 hours to form an intermediate material, and (c) firing the intermediate material in an oxidizing atmosphere at a temperature higher than the

temperature of step (b) and within a range of 650°C to 1000°C for 5 to 50 hours to form a lithium manganese oxide material. The crystallite size of the lithium manganese oxide material is 58 nm or greater and the lattice distortion of the lithium manganese oxide material is 0.09% or less, such that the internal resistance of the lithium secondary battery is reduced.

Applicant respectfully submits that none of the applied references discloses or suggests all of the method steps recited in independent claim 16.

For example, Applicant respectfully submits that there is no disclosure or suggestion in Manev of subjecting a lithium manganese mixture to a firing in an oxidizing atmosphere at a first temperature to form an intermediate material, and then firing the material again in an oxidizing atmosphere at a higher temperature, as recited in step (c) of claim 16. Applicant respectfully submits that Mayer is silent with respect to step (c) recited in claim 16, as well.<sup>1</sup>

With respect to Ogiwara, Applicant respectfully submits that this reference teaches methods for making a layered rock-salt structure ( $\text{LiMnO}_2$ ), not a spinel structure ( $\text{LiMn}_2\text{O}_4$ ), as recited in claim 16. Although Col. 2, lines 60-65 of Ogiwara describe that the lithinated manganese oxide containing  $\text{LiMnO}_2$  "may contain other oxides such as a spinel structure compound  $\text{LiMn}_2\text{O}_4$  in addition to the layered rock-salt structure compound  $\text{LiMnO}_2$ ," Applicant respectfully submits that the methods disclosed in Ogiwara relate only to the layered rock-salt structure. Further, the spinel structure disclosed in Ogiwara (see Col. 9, lines 65-67) has a *rhombic* crystal structure, not a cubic crystal structure, as recited in claim 16. That is, Ogiwara's rhombic spinel belongs to a crystal system that is entirely different from the cubic spinel of claim 16. As such, Applicant respectfully submits that one skilled in the art could not and would not conclude that the claimed crystallite size and lattice distortion would even occur in an entirely different crystal system, regardless of any alleged similarities in processing conditions.

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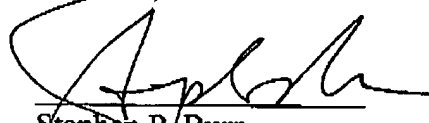
<sup>1</sup> In addition to being silent as to the second firing step, step (c) of claim 16, Applicant respectfully submits that there is also no disclosure or suggestion in Mayer of a Li/Mn ratio in the lithium manganese oxide material exceeding 0.5, as recited in claim 17.

For at least the foregoing reasons, Applicant respectfully submits that all claims pending herein define patentable subject matter over the art of record. Accordingly, Applicant respectfully requests that the above rejections be reconsidered and withdrawn, and that a Notice of Allowance be issued for this application in due course.

If Examiner Bos believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, he is herein requested to call Applicant's attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

  
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September 15, 2003  
Date

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